MPC-3042A/3042AL

2-Axis Motion Control Card

User's Manual (V1.0)

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Correction record

Version	Record
1.0	For driver 1.0 up

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Notes on hardware installation

Please follow step by step as you are installing the control cards.

1. Be sure your system is power off.
2. Be sure your external power supply for the wiring board is power off.
3. Plug your control card in slot, and make sure the golden fingers are put in right contacts.
4. Fasten the screw to fix the card.
5. Connect the cable between the card and wiring board.
6. Connect the external power supply for the wiring board.
7. Recheck everything is OK before system power on.
8. External power on.

Congratulation! You have it.

For more detail of step by step installation guide, please refer the file “installation.pdf “ on the CD come with the product or register as a member of our user’s club at:
http://automation.com.tw/
to download the complementary documents.

1. Forward

Thank you for your selection of 2-axis motion control card. This card adopt the ASIC chip with complex motion functions including point to point, linear and circular interpolation, linear and s-curve acceleration/deceleration and several miscellaneous functions. Dll's of various functions will save you a lot of time in the motion related projects.

Our other motion control products:

MPC-3024 4 axes linear/circular/point to point (standard function) motion control card (PCI bus)
MPC-3028 8 axes linear/circular/point to point (standard function) motion control card (PCI bus)
MPC-3034 advanced 4 axes linear/circular/point to point (standard function) motion control card (PCI bus)
MPC-3035 4 axes linear/circular/point to point (standard function) with advanced encoder counter function / with 2 8bit DA's motion control card (PCI bus)
MPC-3035L 4 axes linear/circular/point to point (standard function) with advanced encoder counter function motion control card (PCI bus)

Any comment is welcome,
please visit our website
http://www.automation.com.tw/
http://www.automation-js.com/ for the up to date information.

Note: MPC3042AL is the functional replacement of MPC3042.

2. Features

2.1 Main card

- 2.1.1 2-axis servo/stepping motor control
- 2.1.2 2 28-bit up/down counter for incremental encoder
- 2.1.3 2 28-bit up/down counter for pulse handler input
- 2.1.4 Pulse output rate up to 6.55MHz
- 2.1.5 Pulse output options : OUT/DIR,CW/CCW
- 2.1.6 linear interpolation
- 2.1.7 circular interpolation
- 2.1.8 S curve or T curve acceleration / deceleration in interpolation and positioning
- 2.1.9 Continuous interpolation
- 2.1.10 Speed change on-the-fly
- 2.1.11 Synchronized start motion
- 2.1.12 Position latch function
- 2.1.13 Simultaneously start/stop on multi-axes
- 2.1.14 Programmable interrupt conditions
- 2.1.15 Backlash compensation
- 2.1.16 Software limit switches protection
- 2.1.17 Motion parameters change on the fly
- 2.1.18 Software key function
- 2.1.19 8 bit PWM DA
- 2.1.20 32 bit timer
- 2.1.21 2 channel 7 bit DA with digital PI control of speed and position loop. (MPC3042A only)
- 2.1.22 Feedback encoder failure detection (MPC3042A only)

2.2 Din rail mounted wiring board

- 2.2.1 JS51050 dummy wiring board for JM4 pulse handler interface
- 2.2.2 ADP-2042DIN wiring board for JF1 motion control interface
- 2.2.3 ADP-9201DIN for ADP9201_JM1 isolated digital I/O interface

3. Specifications

3.1 MPC-3042A/3042AL Main card

Motion

3.1.1 Max pulse rate — 6,553,500 pps

3.1.2 Pulse output mode — Single phase: CLOCK, DIR
Dual phase : CW, CCW

3.1.3 Acceleration / Deceleration mode — linear ,S-curve mode

3.1.4 Homing mode — 14 types

3.1.5 Encoder up/down counter — 2 28bit counter

3.1.6 Pulse Handle up/down counter — 2 28 bit counter

3.1.7 Linear interpolation

3.1.8 Circular interpolation

3.1.9 17 bit DA with digital PI control (MPC3042A only)

Digital I/O

3.1.10 Motion specific input — SRDY, ALM, LS+(EL+), LS-(EL-), SD, HOME(ORG), PCS, LTC, INP, STA per axis, EMG per card

3.1.11 Motion specific output — CMP,SVON,ERC,FIN per axis

3.1.12 General input — 8 bit, photo isolated

3.1.13 General output — 8 bit, photo isolated

3.1.14 TTL I/P — 8 bits

Special I/O

3.1.15 D/A — 8 bits, 0-10Vdc (PWM DA)

3.1.16 D/A — 17 bits, -10V~ +10V (MPC3042A only, if not use for motion)

General

3.1.17 Card ID — 16 position rotary switch

3.1.18 Insulation resistance — 100 MΩ (min) at 1000Vdc

3.1.19 Isolation voltage — 2500Vac 1Min

3.1.20 I/O connector — 68pin female SCSI-II centronic connector
25p D type connector

3.1.21 External supply — DC 24±4V

3.1.22 Operation temperature — 0 to 70° C

3.1.23 Storage temperature — -20 to 80° C

3.1.24 Operation humidity — 5~95% RH, non-condensing

3.1.25 Dimensions — 175(W) * 122(H) mm , 6.9(W) * 4.8(H)in

3.2 Din rail mounted wiring board

ADP-2042DIN for JF1 motion control interface

3.2.1 Connection cable — SCSI-II 68 pin cable to connect main and wiring board

3.2.2 Dimension — ADP-2042DIN(R) / (P) : 121(W)*159(L)*45(H)mm ;
4.8(W)*6.3(L)*1.8(H)in
ADP-2042DIN(N) : 121(W)*159(L)*47(H)mm ;
4.8(W)*6.3(L)*1.9(H)in

3.2.3 External supply — DC 24V±4V

3.2.4 Output capacity — 4 N-MOS output, 1A continuous、120Vdc(max)
Option : 4 P-MOS output, 1A continuous、24Vdc(max)
Option : 4 Relay output, 3A continuous、250Vac(max)

3.2.5 Specific servo control connectors — 2 D-type 26p (1 per axis)

3.2.6 Operation temperature — 0 to 70° C

3.2.7 Operation humidity — RH5~95%, non-condensed

JS51050 for JM4 pulse handler interface

3.2.8 Connection cable — D-type 25P cable to connect main and wiring board

3.2.9 Dimension — 86(W)*79(L)*52(H)mm, 3.4(W)*3.2(L)*2.1(H)in

ADP-9201DIN for ADP9201_JM1 isolated digital I/O

3.2.10 Connection cable — 20P flat cable to connect main and wiring board

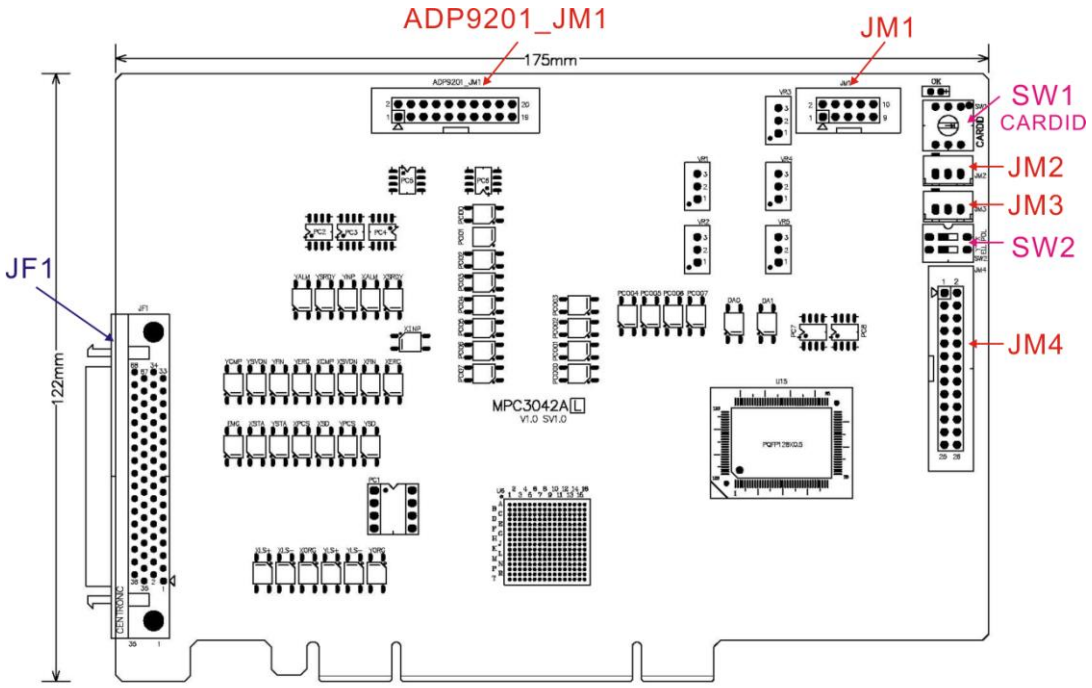
3.2.11 Dimension — ADP-9201DIN(R) / (P) : 86(W) * 103(L) *45(H)mm;
3.4(W)*4.1(L)*1.8(H)in
ADP-9201DIN(S) : 86(W) * 103(L) *50(H)mm;
3.4(W)*4.1(L)*2.0(H)in

3.2.12 indicators — LED, power x 1, digital input x 8, digital output x8

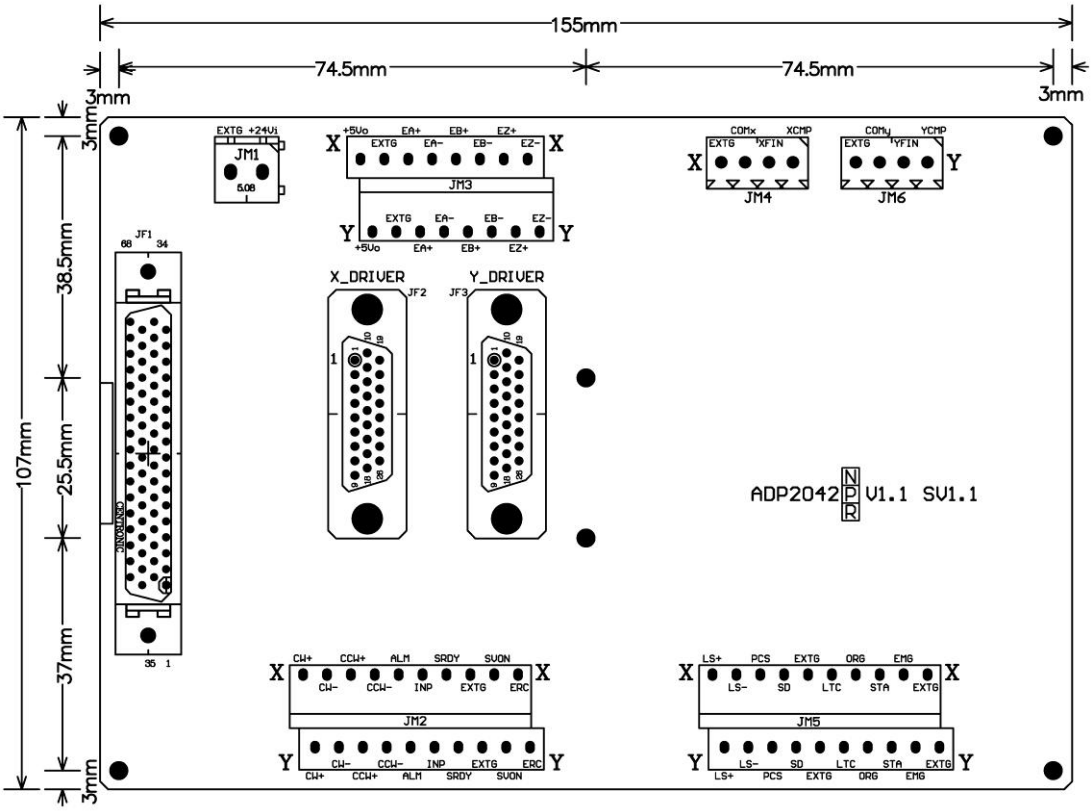
3.2.13 output rating — 3A @250Vac,30Vdc (relay)
1A @24Vdc (PMOS)
2A @240Vac(SSR)

4. Layout and dimension

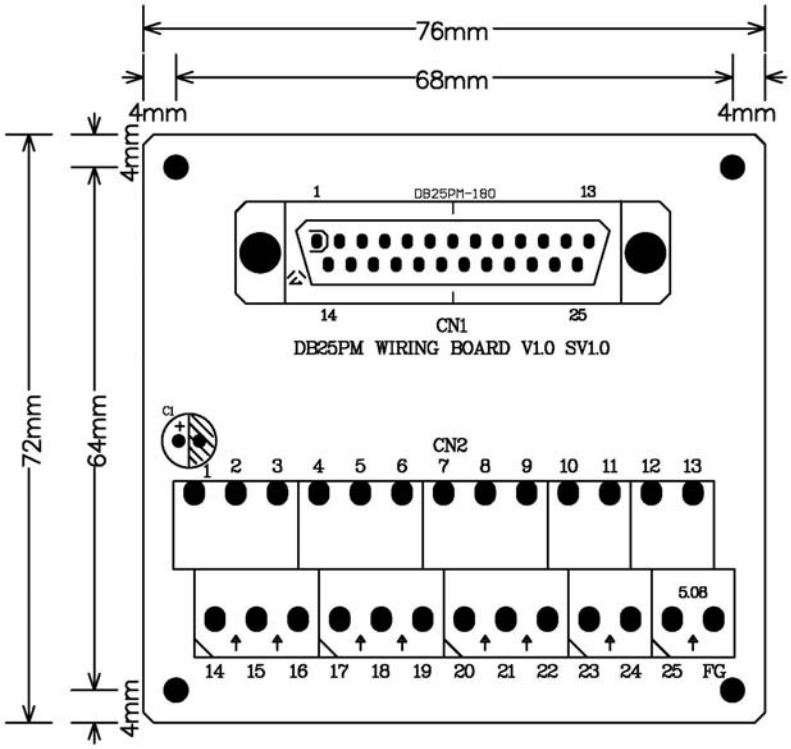
4.1 MPC-3042A/3042AL Main card



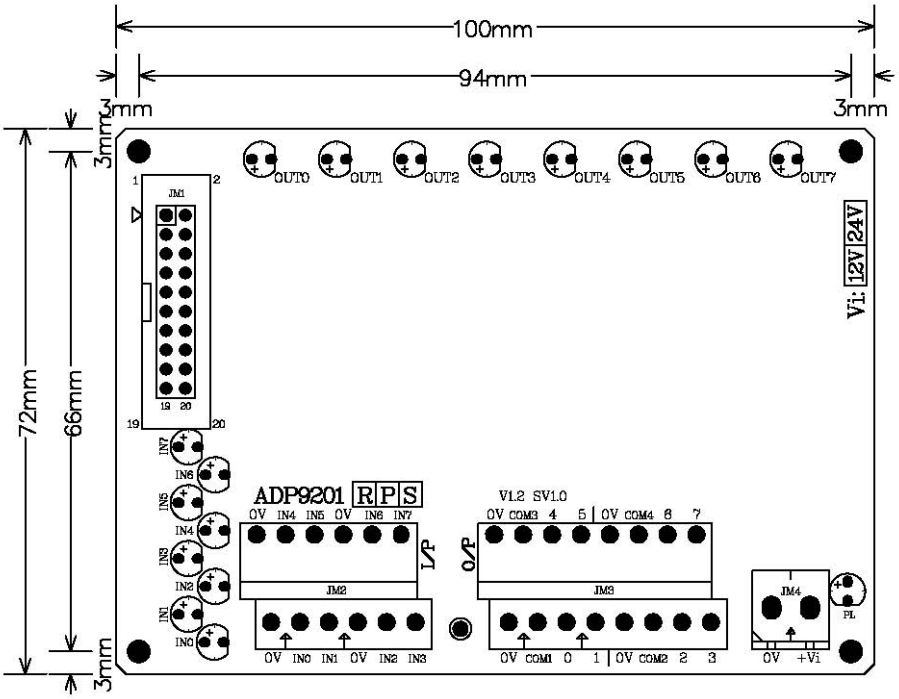
4.2 ADP-2042DIN for JF1 Din rail mounted wiring board



4.3 JS51050 for JM4 25PM Din rail mounted dummy wiring board

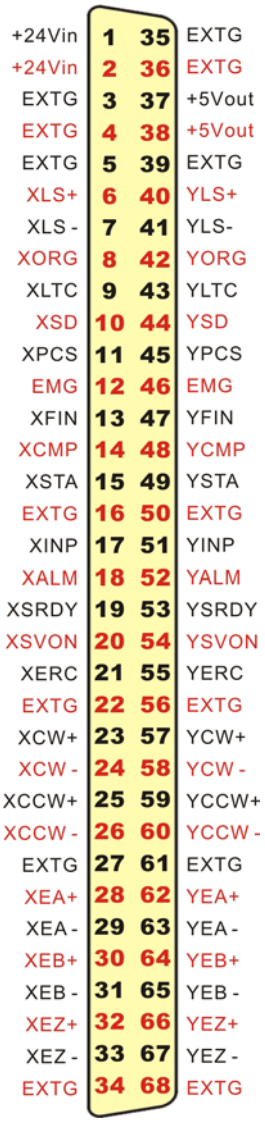


4.4 ADP-9201DIN for ADP9201_JM1 Din rail mounted wiring board



5. Pin definitions

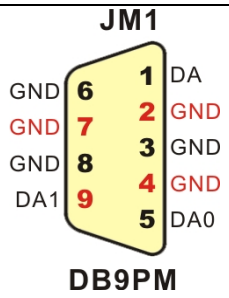
5.1 JF1 Assignment / Definitions


+24Vin 1 35 EXTG
+24Vin 2 36 EXTG
EXTG 3 37 +5Vout
EXTG 4 38 +5Vout
EXTG 5 39 EXTG
XLS+ 6 40 YLS+
XLS - 7 41 YLS-
XORG 8 42 YORG
XLTC 9 43 YLTC
XSD 10 44 YSD
XPCS 11 45 YPCS
EMG 12 46 EMG
XFIN 13 47 YFIN
XCMP 14 48 YCMP
XSTA 15 49 YSTA
EXTG 16 50 EXTG
XINP 17 51 YINP
XALM 18 52 YALM
XSRDY 19 53 YSRDY
XSVON 20 54 YSVON
XERC 21 55 YERC
EXTG 22 56 EXTG
XCW+ 23 57 YCW+
XCW - 24 58 YCW -
XCCW+ 25 59 YCCW+
XCCW - 26 60 YCCW -
EXTG 27 61 EXTG
XEA+ 28 62 YEA+
XEA - 29 63 YEA -
XEB+ 30 64 YEB+
XEB - 31 65 YEB -
XEZ+ 32 66 YEZ+
XEZ - 33 67 YEZ -
EXTG 34 68 EXTG

PIN	I/O	Descriptions	PIN	I/O	Descriptions
1	I	+24V External DC24V power input	35	I	EXTG Common for external power (+24V and +5V)
2	I	+24V External DC24V power input	36	I	EXTG Common for external power (+24V and +5V)
3	I	EXTG Common for external power (+24V and +5V)	37	O	+5Ve Output of on board DC/DC converter
4	I	EXTG Common for external power (+24V and +5V)	38	O	+5Ve Output of on board DC/DC converter
5	I	EXTG Common for external power (+24V and +5V)	39	I	EXTG Common for external power (+24V and +5V)
6	I	XLS+(XEL+) Positive over travel LS input of X axis	40	I	YLS+(YEL+) Positive over travel LS input of Y axis
7	I	XLS-(XEL-) Negative over travel LS input of X axis	41	I	YLS-(YEL-) Negative over travel LS input of Y axis
8	I	XHOME (XORG) HOME(Origin) LS(EL) input of X axis	42	I	YHOME (YORG) HOME(Origin) LS(EL) input of Y axis
9	I	XLTC Latch counter trigger input of X axis	43	I	YLTC Latch counter trigger input of Y axis
10	I	XSD Slowdown LS(EL) input of X axis	44	I	YSD Slowdown LS(EL) input of Y axis
11	I	XPCS Position change start signal input of X axis	45	I	YPCS Position change start signal input of Y axis
12	I	EMG Emergency stop, stop all axes	46	I	EMG Emergency stop, stop all axes
13	O	XFIN General purpose output of X axis	47	O	YFIN General purpose output of Y axis
14	O	XCMP General out or compare out of X axis	48	O	YCMP General out or compare out of Y axis
15	I	XSTA Start motion signal input for X axis	49	I	YSTA Start motion signal input for Y axis
16	I	EXTG Common for external power (+24V and +5V)	50	I	EXTG Common for external power (+24V and +5V)
17	I	XINP General I/p of X axis	51	I	YINP General I/p of Y axis
18	I	XALM ALARM I/p of X axis	52	I	YALM ALARM I/p of Y axis
19	I	XSRDY Servo Ready signal of X axis	53	I	YSRDY Servo Ready signal of Y axis
20	O	XSVON Servo on of X axis	54	O	YSVON Servo on of Y axis
21	O	XERC Output for resetting error counter of X axis	55	O	YERC Output for resetting error counter of Y axis
22	I	EXTG Common for external power (+24V and +5V)	56	I	EXTG Common for external power (+24V and +5V)
23	O	XCW+ CW+ or PULSE+ of X axis	57	O	YCW+ CW+ or PULSE+ of Y axis
24	O	XCW- CW- or PULSE- of X axis	58	O	YCW- CW- or PULSE- of Y axis
25	O	XCCW+ CCW+ or DIR+ of X axis	59	O	YCCW+ CCW+ or DIR+ of Y axis
26	O	XCCW- CCW- or DIR- of X axis	60	O	YCCW- CCW- or DIR- of Y axis
27	I	EXTG Common for external power (+24V and +5V)	61	I	EXTG Common for external power (+24V and +5V)
28	I	XEA+ Encoder phase A+ feedback of X axis	62	I	YEA+ Encoder phase A+ feedback of Y axis
29	I	XEA- Encoder phase A- feedback of X axis	63	I	YEA- Encoder phase A- feedback of Y axis
30	I	XEB+ Encoder phase B+ feedback of X axis	64	I	YEB+ Encoder phase B+ feedback of Y axis
31	I	XEB- Encoder phase B- feedback of X axis	65	I	YEB- Encoder phase B- feedback of Y axis
32	I	XEZ+ Encoder phase Z+ feedback of X axis	66	I	YEZ+ Encoder phase Z+ feedback of Y axis
33	I	XEZ- Encoder phase Z- feedback of X axis	67	I	YEZ- Encoder phase Z- feedback of Y axis
34	I	EXTG Common for external power (+24V and +5V)	68	I	EXTG Common for external power (+24V and +5V)

5.2 JM1 Assignment / Definitions

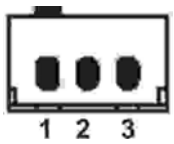
PIN	Description
6	GND
7	GND
8	GND
9	DA1 (-10V ~ +10V)



PIN	Description
1	PWM DA (0~10V)
2	GND
3	GND
4	GND
5	DA0 (-10V ~ +10V)

5.3 JM2,JM3 Assignment / Definitions

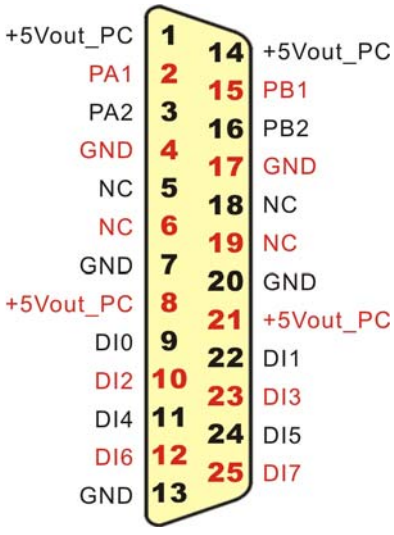
PIN	Description
1	CSTA: common start I/O
2	CSTP: common stop I/O
3	GND



Note: Connect CSTA low to start motion from external.
Connect CSTP low to emergency stop motion from external.

5.4 JM4 Assignment / Definitions

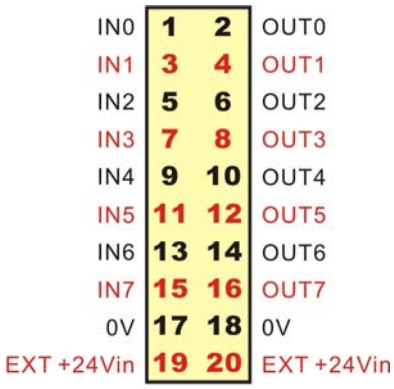
PIN	Description
1	+5V from PC
2	Pulse handler1 A phase input
3	Pulse handler2 A phase input
4	GND
5	NC
6	NC
7	GND
8	+5V from PC
9	TTL I/P bit0
10	TTL I/P bit2
11	TTL I/P bit4
12	TTL I/P bit6
13	GND



PIN	Description
14	+5V from PC
15	Pulse handler1 B phase input
16	Pulse handler2 B phase input
17	GND
18	NC
19	NC
20	GND
21	+5V from PC
22	TTL I/P bit1
23	TTL I/P bit3
24	TTL I/P bit5
25	TTL I/P bit7

5.5 ADP9201_JM1 Assignment / Definitions

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	IN0: input0		2	OUT0:output0
3	IN1: input1		4	OUT1:output1
5	IN2: input2		6	OUT2:output2
7	IN3: input3		8	OUT3:output3
9	IN4: input4		10	OUT4:output4
11	IN5: input5		12	OUT5:output5
13	IN6: input6		14	OUT6:output6
15	IN7: input7		16	OUT7:output7
17	DGND: digital ground (EXTG)		18	DGND: digital ground (EXTG)
19	+24Ve: external input power supply		20	+24Ve: external input power supply

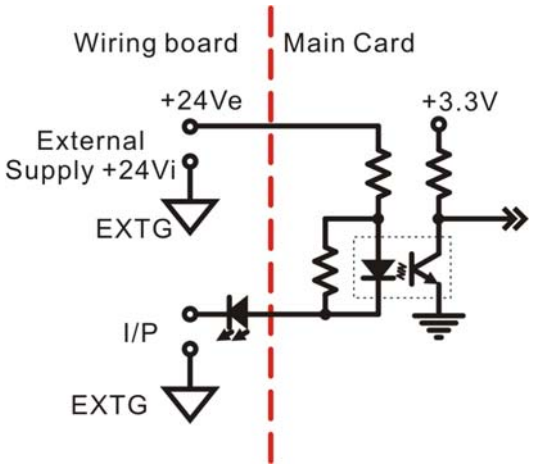

IN0 1 2 OUT0
IN1 3 4 OUT1
IN2 5 6 OUT2
IN3 7 8 OUT3
IN4 9 10 OUT4
IN5 11 12 OUT5
IN6 13 14 OUT6
IN7 15 16 OUT7
0V 17 18 0V
EXT +24Vin 19 20 EXT +24Vin

6. I/O interface diagram

6.1 JF1 ADP-2042DIN

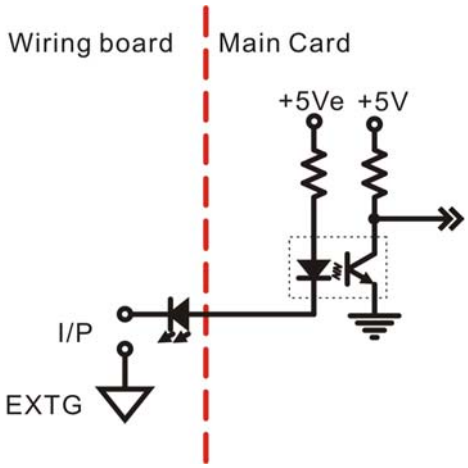
6.1.1 Input diagram

Type 1 input:



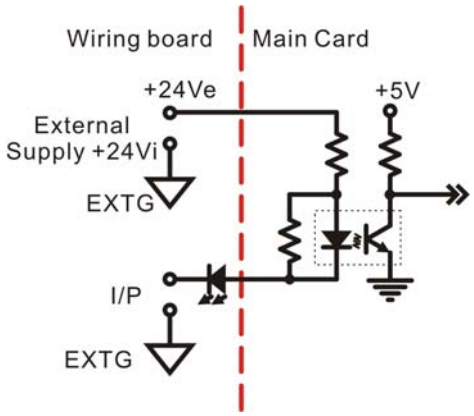
For input: LS+(EL+), LS-(EL-), HOME(ORG)

Type 2 input:



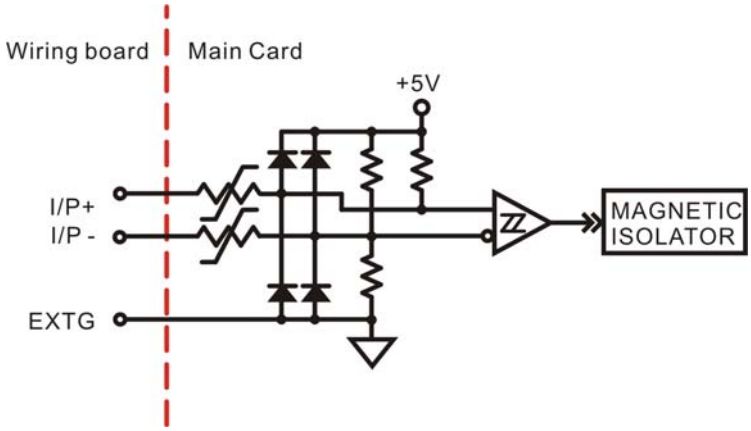
For input: INP,SRDY,ALM

Type 3 input:



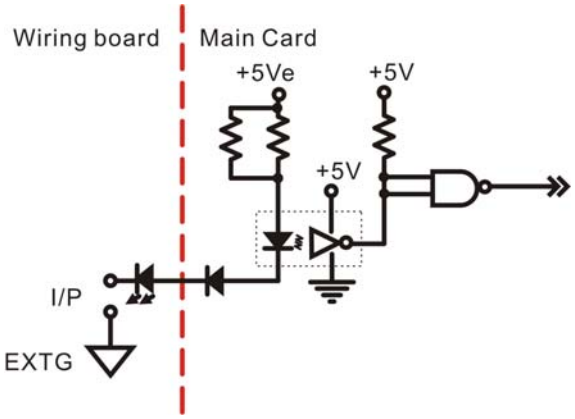
For input: ESD,PCS,STA,EMG

Type 4 input:



For encoder feedback input : A+/-,B+/-,Z/-

Type 4 input:

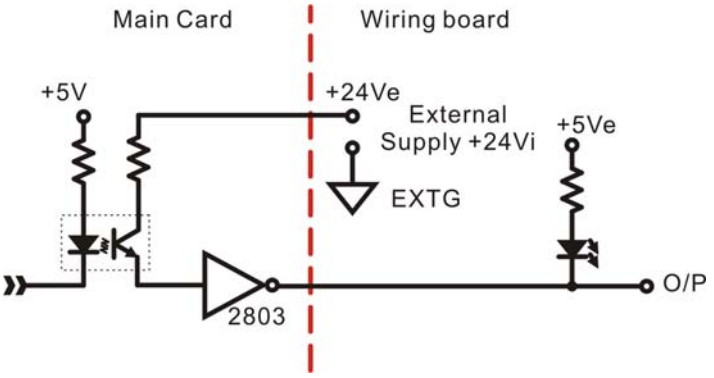


For input: LTC

Note: If you do not use the standard wiring board, please use a LED to the input circuit as shown above to prevent excess current of photo-coupler.

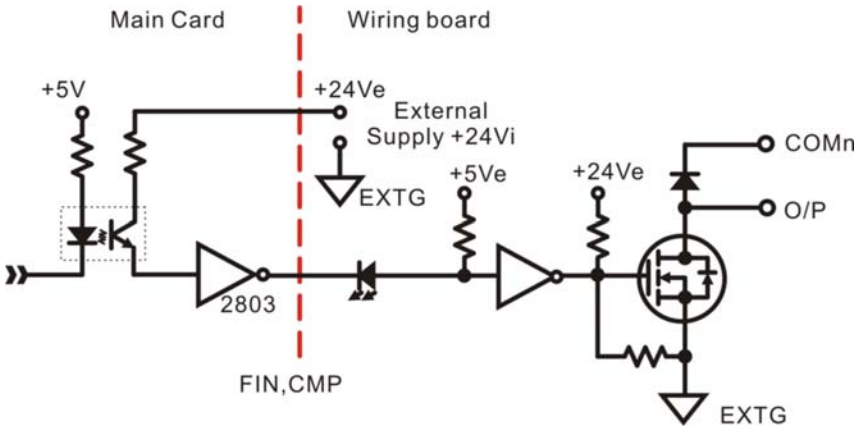
6.1.2 Output Diagram

Type 1 output:



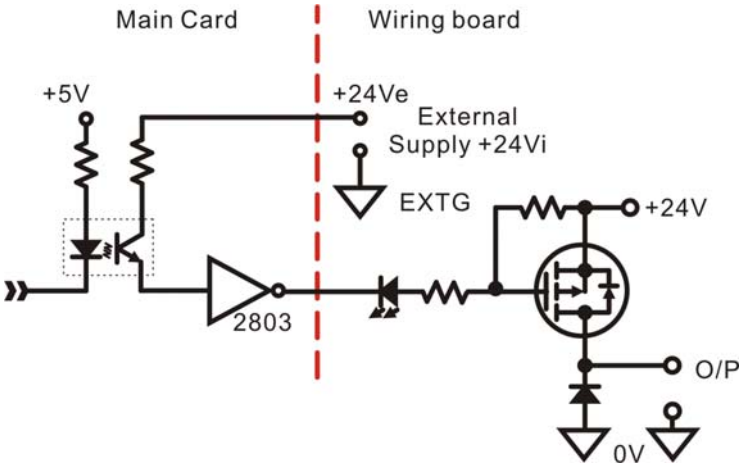
For SVON, ERC

Type 2 output:



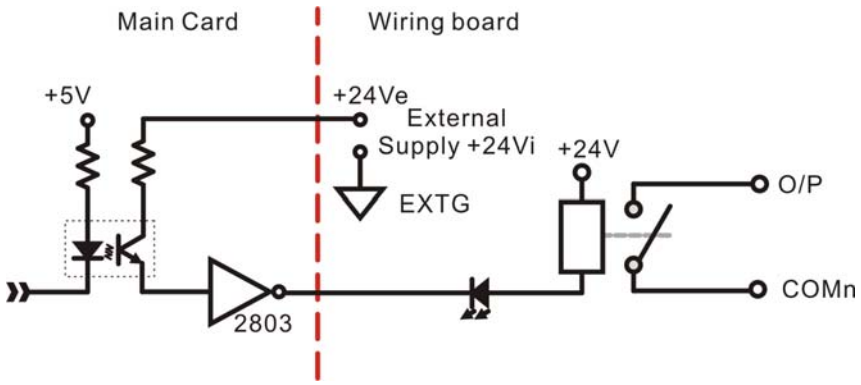
FIN,CMP(N-MOS)

Type 3 output:



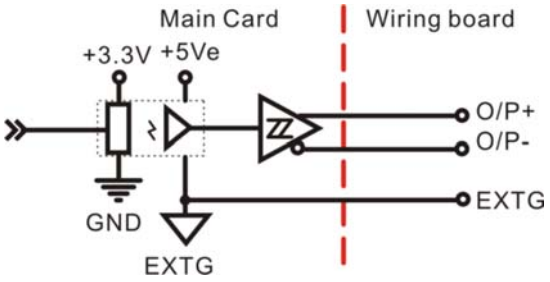
FIN,CMP(P-MOS)

Type 4 output:



FIN,CMP(RELAY)

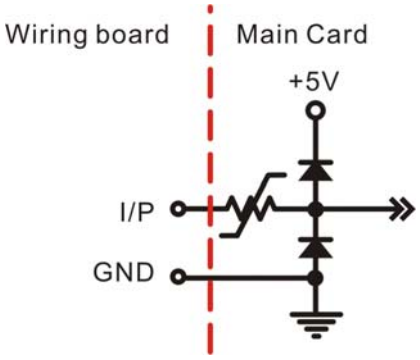
Type 5 output:



For motion control pulse output : CW,CCW

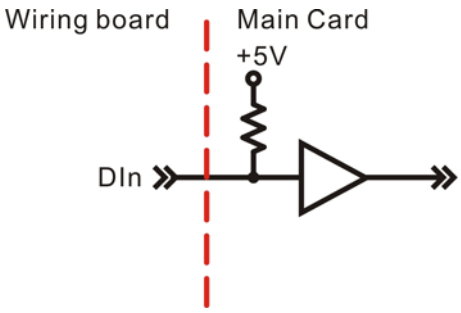
6.2 JM4 JS51050

Type 1 Input:



For Pulse Handler Input : PA,PB

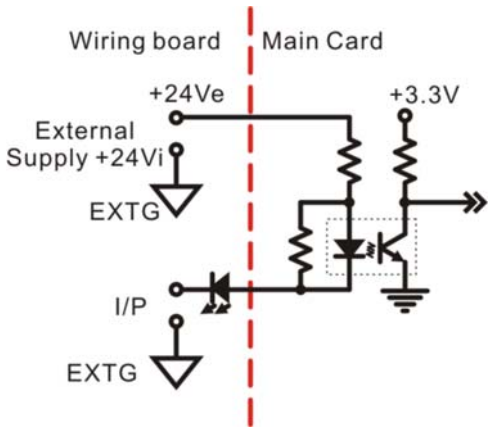
Type 2 TTL input:



For DI0 ~ DI7

6.3 ADP9201_JM1 ADP-9201DIN

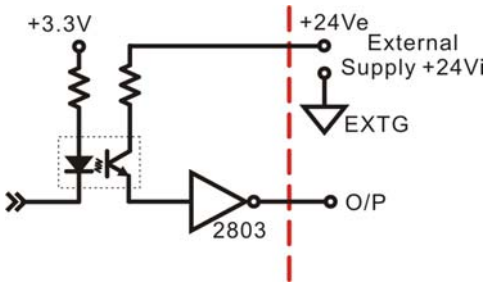
6.3.1 Input:



For input: IN0 ~ IN7

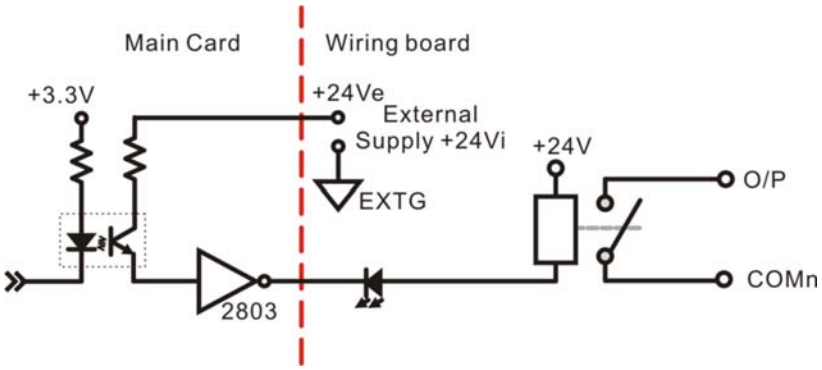
6.3.2 Output:

Type 1 output:



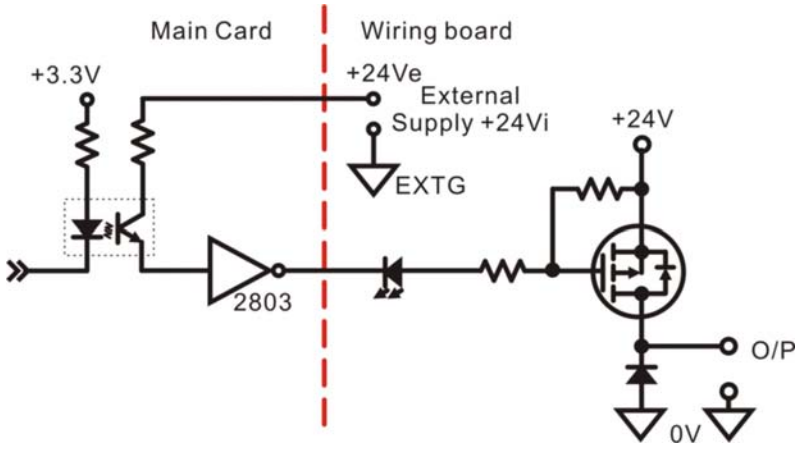
For OUT0 ~ OUT7(Transistor)

Type 2 output:



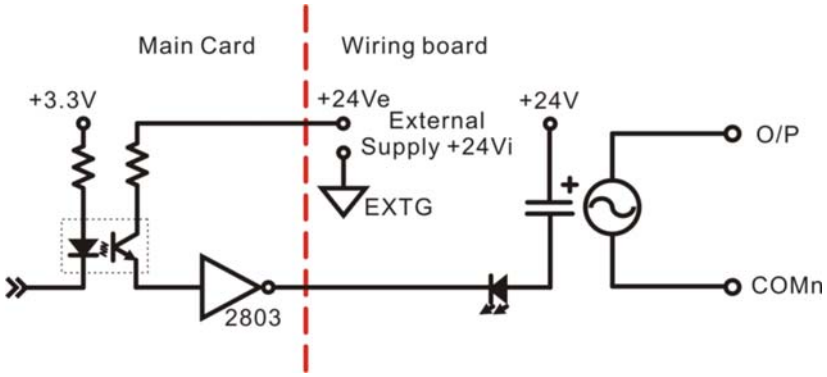
For OUT0 ~ OUT7(Relay)

Type 3 output:



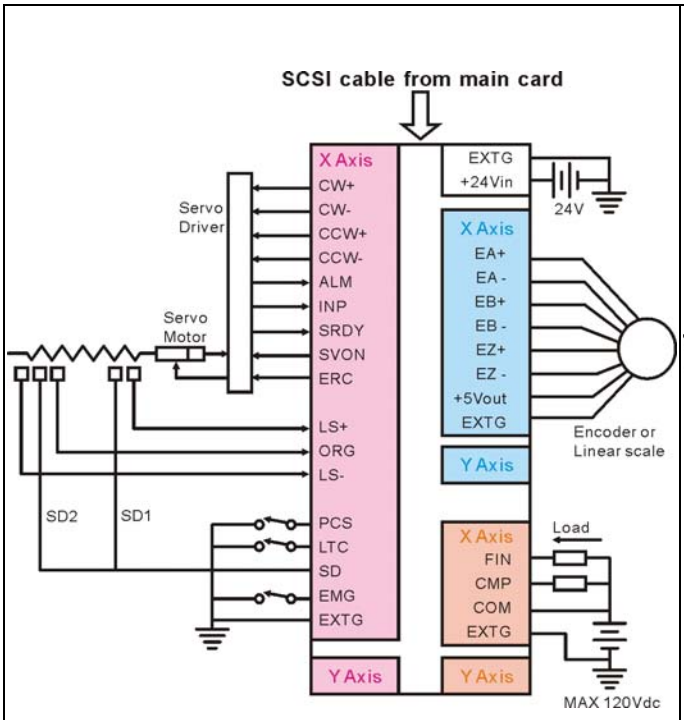
For OUT0 ~ OUT7(PMOS)

Type 4 output:

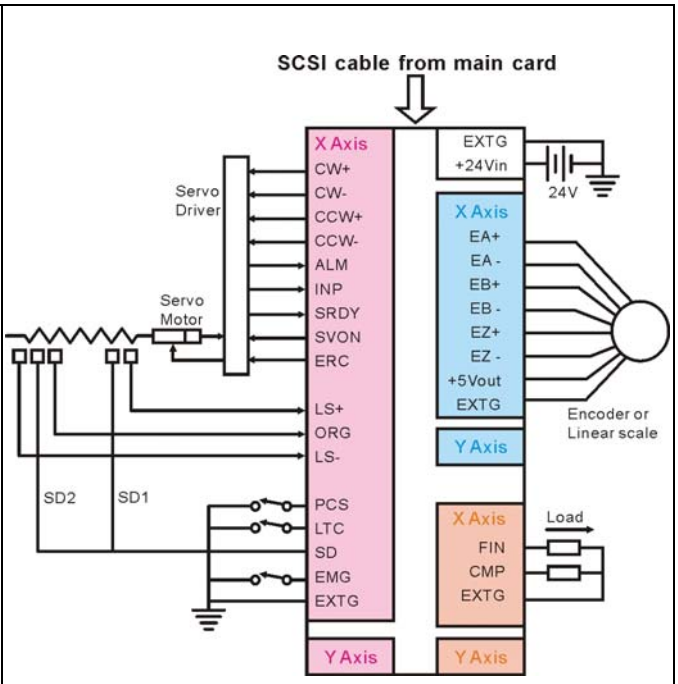


For OUT0 ~ OUT7(SSR)

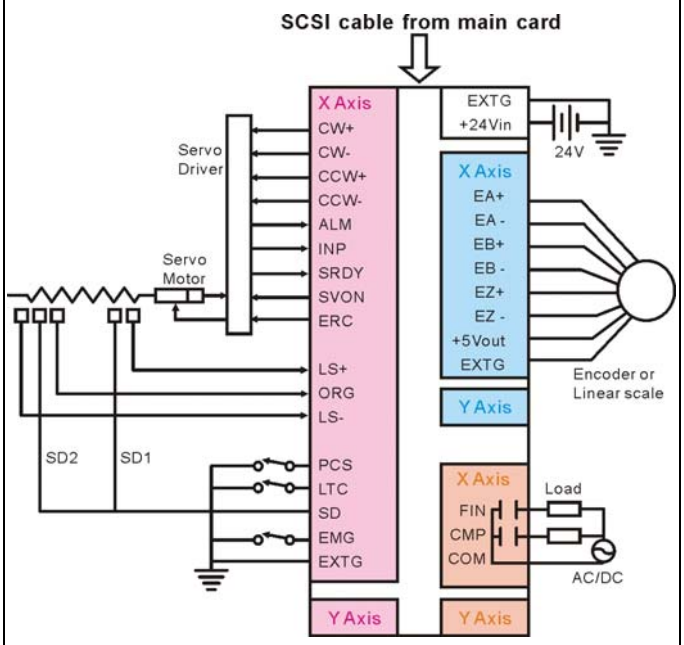
7. External wiring diagram



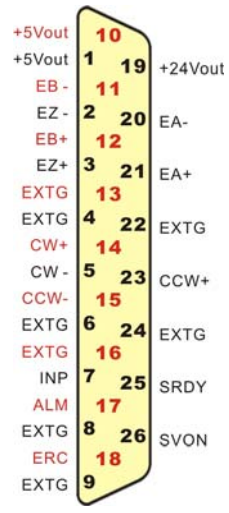
wiring board with NMOS output



wiring board with PMOS output



Wiring board with Relay output



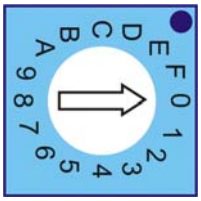
* User may connect the signals with this DB26 specific connectors (one axis per connector) or screw terminals.

Wiring board DB26 specific connector

8. Hardware settings

8.1 Card ID setting

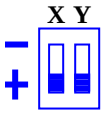
Since PCI cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows. A 4 bits ROTARY switch (select from 0 to 0xF)for extinguishing the 16 identical card.



8.2 Polarity setting for over-travel limit switch

For different applications maybe you have different considerations, the polarity of over-travel limit switch can be set by on card Dip switch to meet your requirement.

Say X, Y axis polarity is positive the DIP switch set as follows.

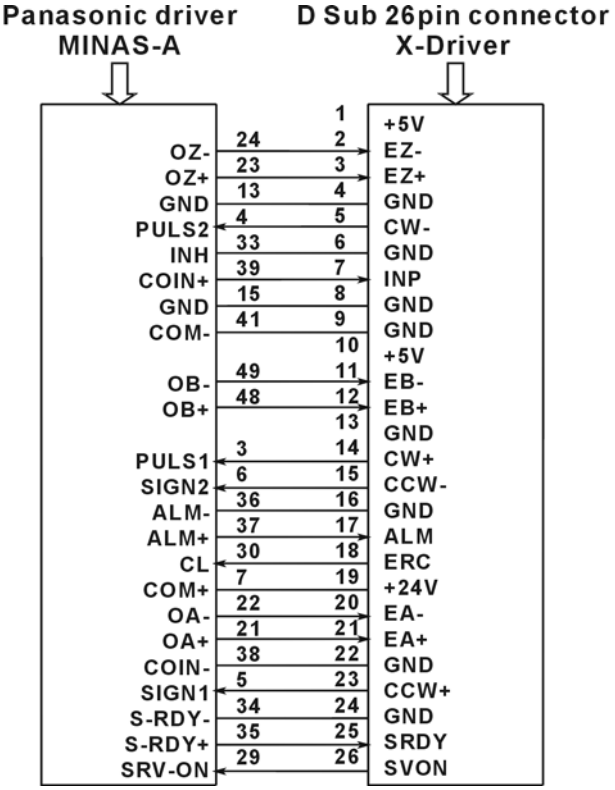


9. Applications

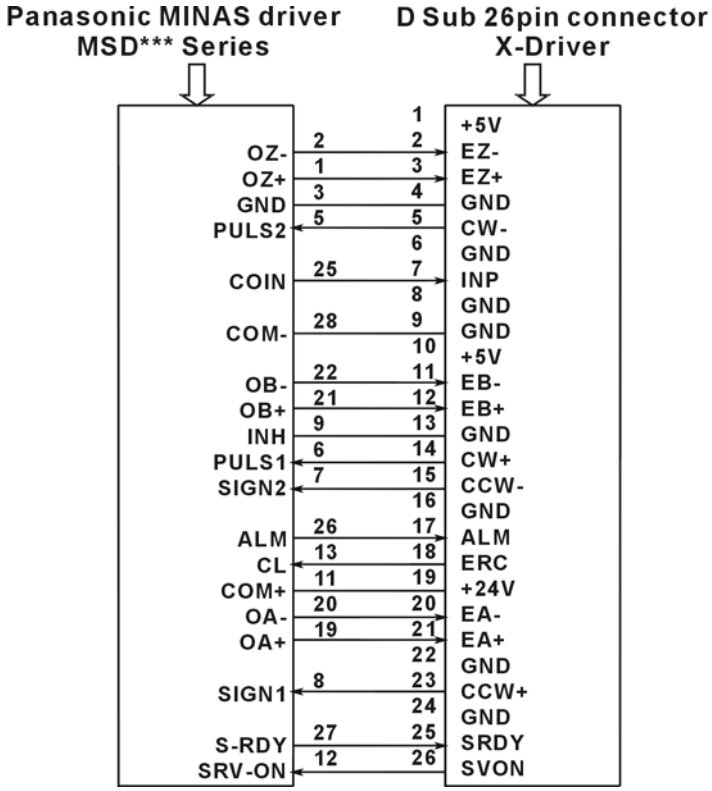
- Precision positioning control
- Precision speed control
- Contouring control
- X-Y table control
- Rotary machine control
- Robotic control
- Biotech sampling and handling
- Any combined control of servo and stepping motors

10. Wiring diagram examples

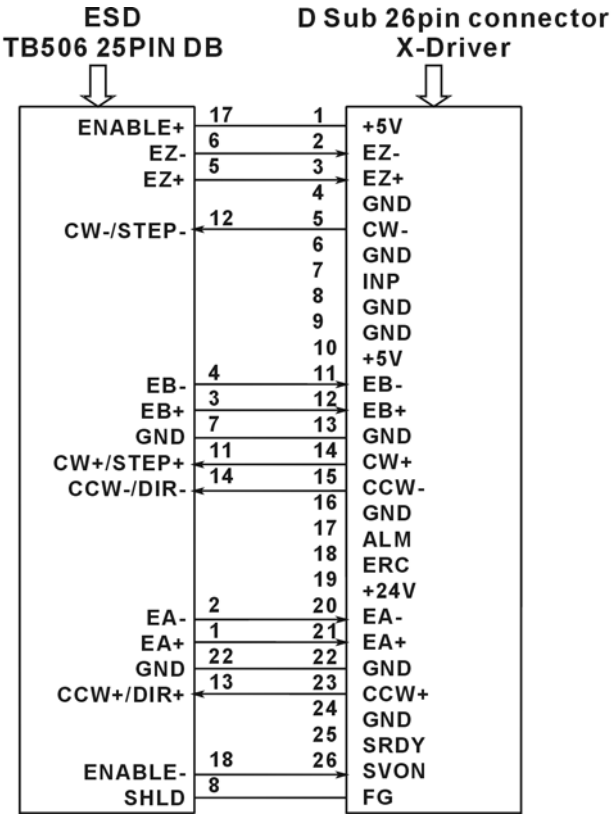
10.1 The wiring diagram for MPC-3042A/3042AL wiring board to panasonic MINAS-A driver



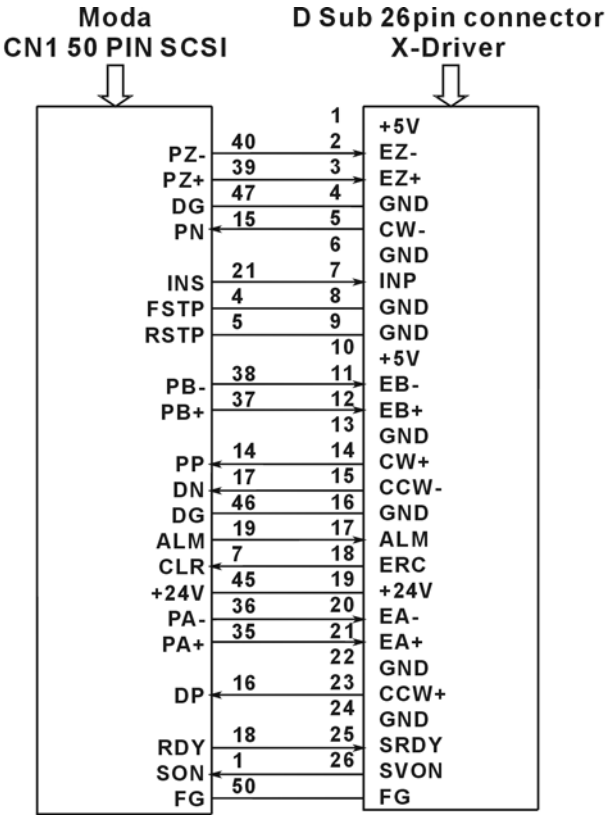
10.2 The wiring diagram for MPC-3042A/3042AL wiring board to panasonic MINAS MSD*** driver



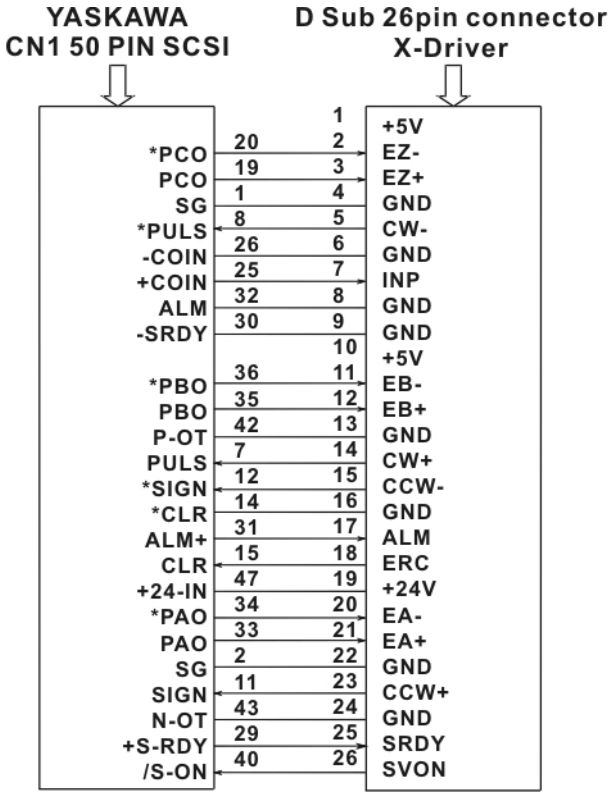
10.3 The wiring diagram for MPC-3042A/3042AL wiring board to ESD servo driver



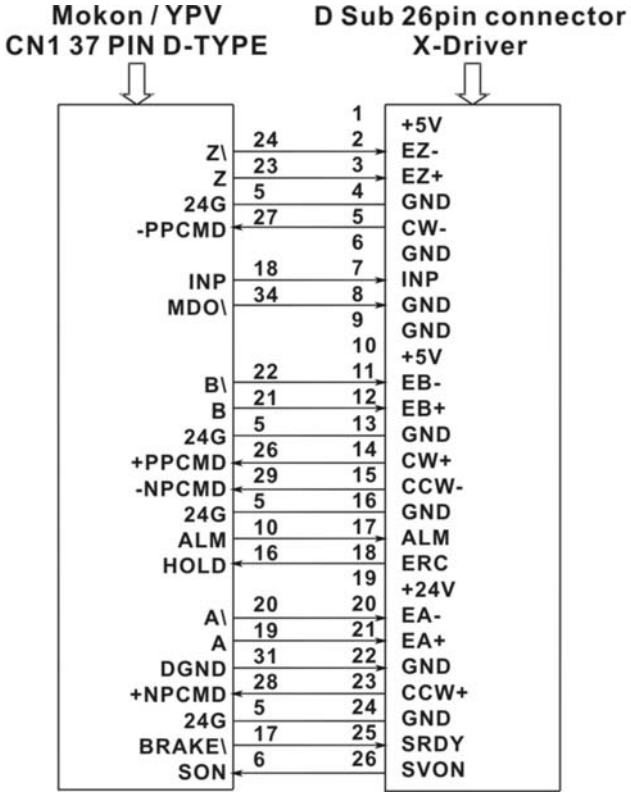
10.4 The wiring diagram for MPC-3042A/3042AL wiring board to Moda servo driver



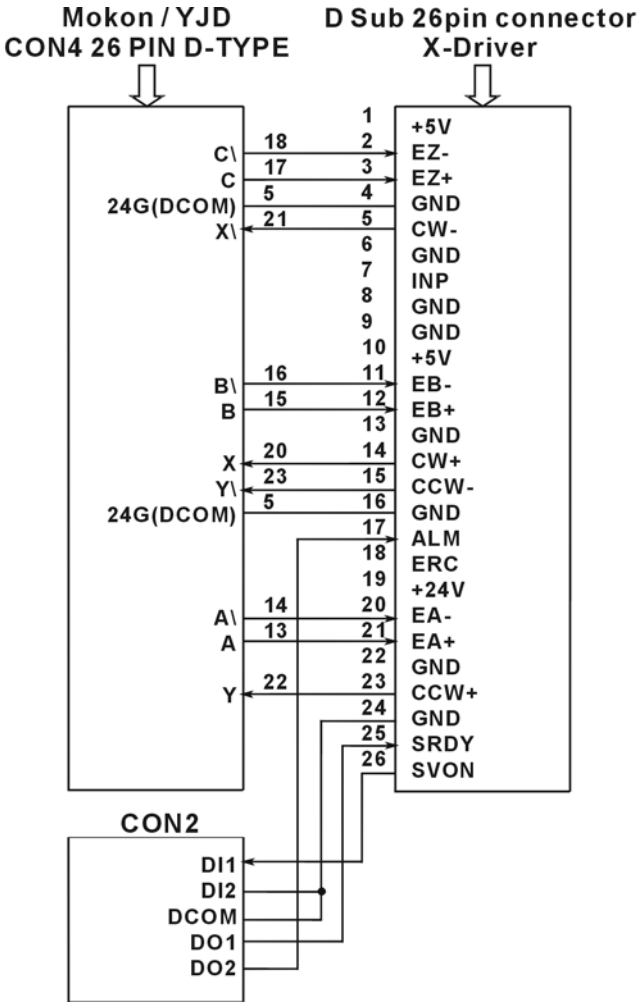
10.5 The wiring diagram for MPC-3042A/3042AL wiring board to YASKAWA servo driver



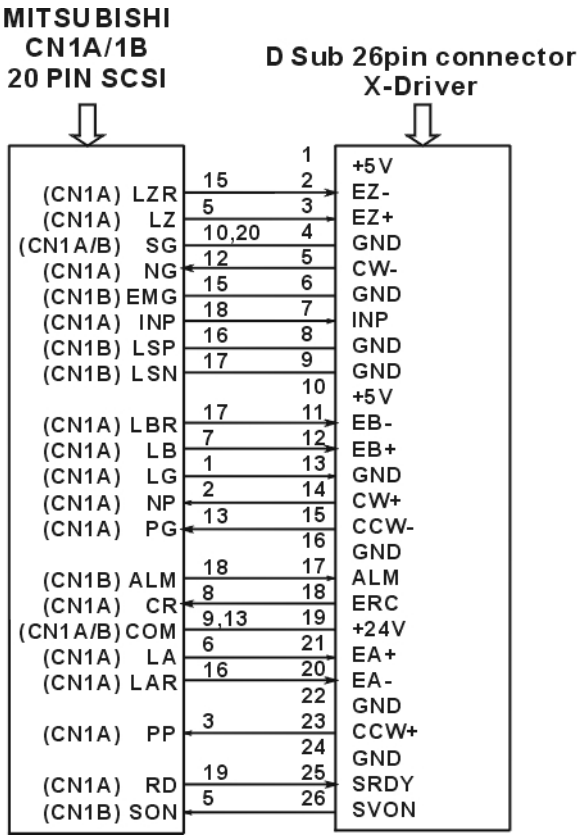
10.6 The wiring diagram for MPC-3042A/3042AL wiring board to Mokon / YPV servo driver



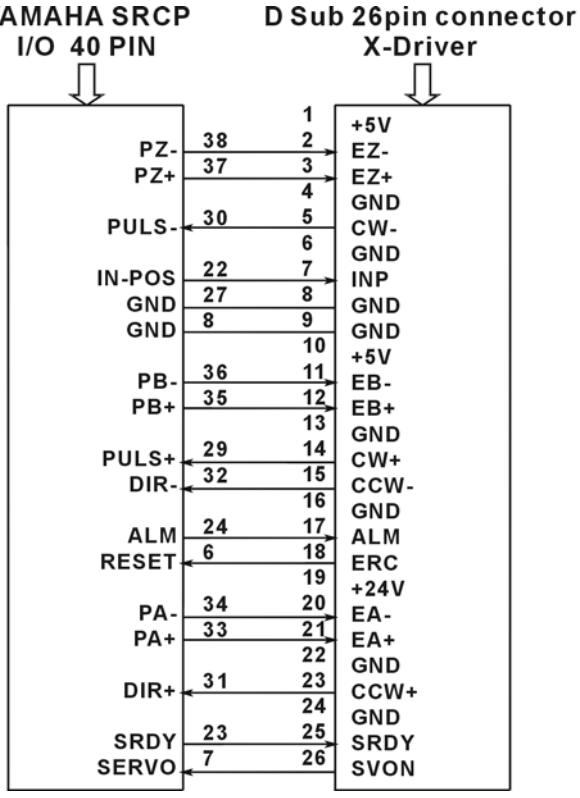
10.7 The wiring diagram for MPC-3042A/3042AL wiring board to Mokon / YJD servo driver



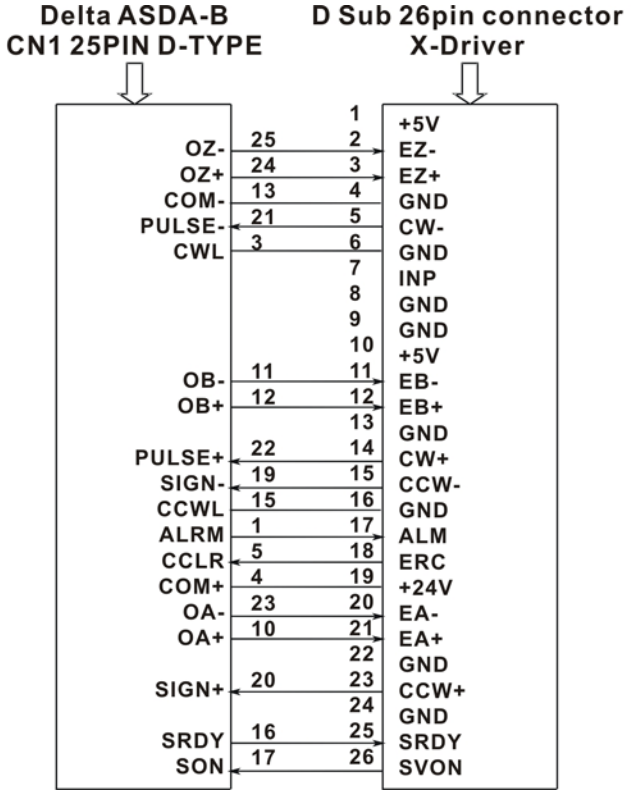
10.8 The wiring diagram for MPC-3042A/3042AL wiring board to MITSUBISHI J2-SUPER servo driver



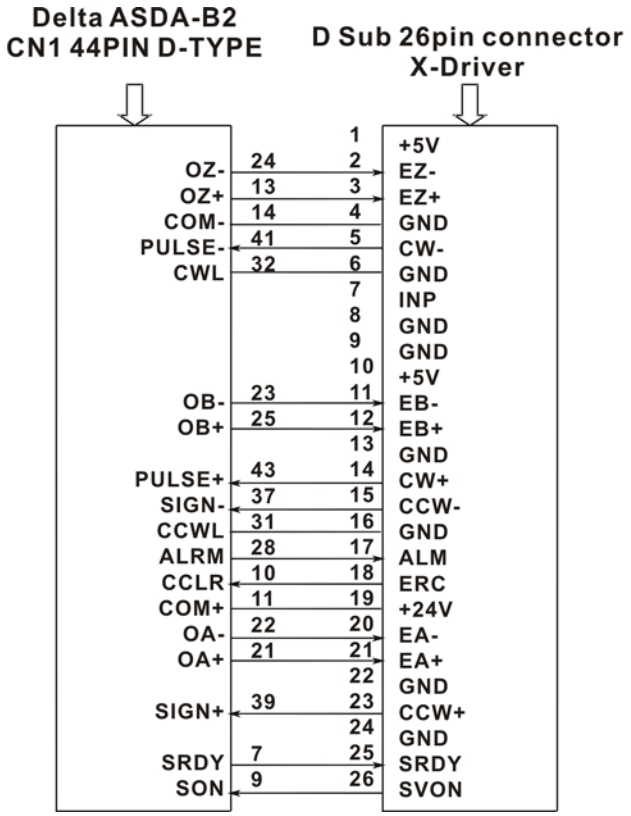
10.9 The wiring diagram for MPC-3042A/3042AL wiring board to YAMAHA SRCP servo driver



10.10 The wiring diagram for MPC-3042A/3042AL wiring board to Delta ASDA-B servo driver



10.11 The wiring diagram for MPC-3042A/3042AL wiring board to Delta ASDA-B2 servo driver



11. Ordering information

PRODUCT	DESCRIPTIONS
MPC3042A	2-axis motion control card for servo/step motor control with pulse referenced PI control (include SM2341104)
MPC3042AL	2-axis motion control card for servo/step motor control (include SM2341104)
ADP-2042DIN(N)	DIN rail mounted wiring board matched MPC-3042A/3042AL,General output : 4 power NMOS
ADP-2042DIN(P)	DIN rail mounted wiring board matched MPC-3042A/3042AL,General output : 4 power PMOS
ADP-2042DIN(R)	DIN rail mounted wiring board matched MPC-3042A/3042AL,General output : 4 relays
ADP-9201DIN(R)	DIN rail mounted wiring board with 16 I/O LED indicators and relay output for 8DI and 8DO for ADP9201_JM1
ADP-9201DIN(P)	DIN rail mounted wiring board with 16 I/O LED indicators and PMOS output for 8DI and 8DO for ADP9201_JM1
ADP-9201DIN(S)	DIN rail mounted wiring board with 16 I/O LED indicators and SSR output for 8DI and 8DO for ADP9201_JM1
JS51050	DIN rail mounted dummy wiring board (D type 25p male to terminals) for JM4
FVC01	Frequency to voltage module
M266868154	68-pin SCSI cable 1.5M
M266868302	68-pin SCSI cable 3.0M
M270325X4	D type 25p male-female cable 1.5M
M270325X4S	D type 25p male-female cable 1.5M,shielding
M270325X0	D type 25p male-female cable 3.0M
M270325X0S	D type 25p male-female cable 3.0M,shielding
M23207	20 pin flat cable 1.5M
M23209	20 pin flat cable 3.0M
SM2341104	Extension kit for JM1and JM4 (bracket and flat cable for 9p male D-type and 25p female D-type connector)